Hill. At that time he assisted in the research work on gaseous spectra in which Sir Edward Frankland and Sir Norman Lockyer were jointly occupied. This naturally turned Pedler's attention to the fascinating problems connected with the physical constitution of the sun and the stars. Consequently, on receiving, in 1873, the appointment as professor of chemistry in the Presidency College, Calcutta, it is not surprising to find that it was some years before he again gave special attention to ordinary terrestrial chemistry. The experience already gained qualified him for observation of meteorological phenomena, and soon after his arrival in India he was charged with special duty in connection with the eclipse expedition in 1875.

At this time, having been born in 1849, Pedler was still a very young man, and before quitting this portion of his career those who knew him in those early days will gladly recall the charming features of his character which made him not only popular in youth, but, remaining unchanged to his latest years, contributed so materially to his success in official life. Chemists who attend the long-established Chemical Dining Club are probably not all aware that it was started by Pedler in or about 1872, and that he acted as secretary so long as he remained in England.

In India, Pedler retained the professorship in Calcutta together with the office of Meteorological Reporter to the Government of Bengal for twenty-two years. He then became principal of the college and vice-chancellor of the Calcutta University. In 1899, he was appointed Minister of Public Instruction in Bengal and additional member of the Legislative Council. These successive steps in official life serve as sufficient explanation of the fact that Pedler's original contributions to scientific chemical literature were limited to the one paper on valeric acids, already mentioned, and several which naturally arose out of the conditions of his occupation in India. Soon after his arrival in that country he examined the coal-gas and the water supplies of Calcutta. In 1878 he sent home a paper on the cobra poison, which was printed in the Proceedings of the Royal Society (vol. xxvii., p. 17); while, in 1890, he contributed to the Journal of the Chemical Society three papers the titles of which show that he was utilising opportunities, previously neglected by chemists, of studying the action of tropical sunlight on chemical change.

On his retirement, Pedler received the honour of knighthood, and on his return to England, in 1906, he speedily found occupation in public work. He became honorary secretary to the British Science Guild, which owes much to his devoted service; and on the outbreak of war he took up active duties connected with the research department of the Ministry of Munitions.

Pedler was twice married, but left no children. His widow was the youngest daughter of the late Mr. Warburton, R.N., of Dedham.

W. A. T.

NOTES.

THE *Financier and Bullionist* of May 14 contains an important article by Sir William Tilden under the title "The Present Position of the Dye Question." The article is addressed mainly to business men, and is, therefore, pretty free from chemical technicalities. It sets forth clearly the causes—partly commercial, partly educational—which led to the decline of the British manufacture and the ascendancy and ultimate practical monopoly of the industry by Germany. The most serious weapon in the hand of the enemy, it is pointed out, is the position of respect which in Germany is accorded to science. The close relation of the universities to the industries of the country, and the fact that the German dye-makers have at their disposal a large body of trained experts, many of them distinguished chemists, who are not only employed in the works, but are also on the directorate, are the chief conditions of the success Germany has achieved in this direction. Sir Albert Stanley, President of the Board of Trade, announced in the House of Commons on May 15 the course which the Board, on behalf of the Government, proposes to take, among other things, in respect to the dye industry. The proposals include further financial aid to manufacturers of special colours and protection for a period of ten years after the war by controlling the importation of foreign dyestuffs by a system of licences. He also stated that negotiations were in progress for the amalgamation of British Dyes, Ltd., and Messrs. Levinstein, Ltd., who were the most important of the dye manufacturers in this country. The arrangements proposed provided for the new company being permanently under British control, for Government representation on the board of directors, and for securing reasonable prices and equitable distribution of the products to the dye-users, so as to avoid anything in the nature of a monopoly. This is all good so far as it goes, but the Government, any more than the man in the street, has not yet grasped the idea that this is a chemical business in the first place, and that to leave the direction chiefly in the hands of Government officials while the chemist is relegated to a subordinate position is to neglect the conditions which have been proved by long experience in Germany to be the only assurance of permanent security and success.

ATTENTION is directed in the *Times Engineering Supplement* for May to the part which technical production is taking in Germany in advancing the fertiliser problem, especially with regard to fertilisers capable of production from synthetic ammonia. For the manufacture of cheap hydrogen, a most essential factor in successful commercial ammonia synthesis, the Badische Anilin- & Soda-Fabrik has developed a catalytic hydrogen process in which large quantities of carbon dioxide are simultaneously obtained. The titles of a series of patents applied for by this company reveal the ideas whereby this by-product is to be utilised. A patent dated August 7, 1914, is concerned with "fertiliser." Three patents in December of the same year cover the manufacture of urea and of products and compounds for use in such manufacture. In June, 1915, a patent application for the manufacture of carbonic acid compounds of ammonia was filed; whilst in March, 1916, a further patent of the same company for fertiliser and method of fertilising was indicated. Obviously the object aimed at is the utilisation of the available carbonic acid from the hydrogen process in preference to the more expensive sulphuric acid necessary for the production of ammonium sulphate. The manufacture of urea would yield a fertiliser containing 43·7 per cent. of combined nitrogen as compared with 21·2 per cent. in sulphate of ammonia. This tendency in German fertiliser production merits especial consideration by those responsible for the erection of a Haber plant in this country, as indicated in the recent communication of Mr. Kellaway to the House of Commons, since, as a post-war proposition, such a plant would be employed for the manufacture of agricultural fertilisers. By close co-operation between those concerned in the production of hydrogen for synthetic ammonia and the experts in fertiliser values a decision should readily be reached as to the efficacy of carbonaceous ammonia compounds and derivatives, and consequently as to the best course of procedure in regard to hydrogen production.

In *La Nature* of May 4 Prof. L. de Launay publishes an authoritative article upon the economic importance of Alsace-Lorraine. As might be well supposed from its authorship, the article deals particularly with the mineral products, but refers also to the well-developed textile industries and the various forms of agricultural produce of this region. The author shows that in 1913 German Lorraine produced 21 million tons of iron ore out of a total production of 27·5 millions for Germany (including 6·5 million tons from Luxemburg), whilst French Lorraine produced 19·5 million tons out of a total of 21·7 millions from the whole of France, or a total of 47 million tons of iron ore produced by the whole Lorraine basin. He points out that the possession of this Lorraine iron-ore deposit was the basis not only of Germany's industrial strength, but also of her military power; it is only owing to the possession of this supply of iron ore that Germany has been able to continue the struggle for the last four years. Once, however, Lorraine becomes again a French possession, Germany will be unable to maintain in their present extension the works that produce her engines of destruction, and thus a result would be obtained which otherwise no league of nations, no international tribunal, no treaty capable of being torn up as occasion might require, could secure. Restitution of the Lorraine iron ore to its rightful French owners means, in fact, a guarantee of peace to the world. Of great importance, too, to France would be the Sarre coalfield, which belonged wholly to France up to 1815. When France re-enters into possession of this field, it will be able to supply a certain portion of her needs for coal, having an output of some 17 million tons of coal yearly. Another most valuable mineral product is to be found in the potash deposits of Mulhouse, discovered in 1904, but only slowly developed; the first pit was completed in 1911, in which year the output was 127,000 tons. It must be remembered, however, that Prussia, the owner of the Stassfurt potash deposits, was by no means anxious to see the Alsatian potash deposits developed in competition with the former, and that the Mulhouse deposits can produce very much more than they have done hitherto. Finally, there is a small oilfield just to the north-west of Strasburg, first discovered in 1880, and though far inferior in value to the iron, coal, and potash deposits, nevertheless, with its production of 50,000 tons of oil yearly, it is by no means devoid of importance for France.

The concluding Friday evening discourses at the Royal Institution are as follows:—On May 24, Lt.-Col. A. G. Hadcock on "Internal Ballistics"; on May 31, Mr. Laurence Binyon on "Poetry and Modern Life"; and on June 7, Sir Boverton Redwood on "The Romance of Petroleum."

The Duke of Northumberland, who died on May 14 at seventy-two years of age, was a familiar figure in the scientific world. He became a fellow of the Royal Society in 1900 under the rule which permits of the special election of Privy Councillors and men distinguished in the scientific or educational service of the State; and he had been for many years president of the Royal Institution. He was president of the Royal Archæological Institute from 1884 to 1892, and was elected a trustee of the British Museum in 1900.

Capt. Roald Amundsen's long-delayed North Polar Expedition is now announced to start from Norway next month. The *Maud*, the new vessel built for the expedition, is lying ready at Christiania. According to *La Géographie* (vol. xxxii., No. 1), the *Maud* is built on the lines of the *Fram*, and is a three-masted schooner furnished with a petrol motor and capable of a speed of nine knots. Her length is 120 ft., her beam measurement 40 ft., and her draught 12 ft. The screw can be raised to avoid ice-pressure. The petrol capacity of the vessel is 100 metric tons. The original plan of Capt. Amundsen was to enter the Arctic Ocean by Bering Strait. He now proposes to follow the route of the *Fram* through the Barents and Kara Seas along the coast of Asia, and to enter the polar pack about 250 miles east of the New Siberia Islands, allowing his vessel to be caught in the current which crosses the Arctic Ocean.

In *La Nature* for May 11 Lieut. Lefranc, of the French Air Service, gives very complete particulars of the armament and bomb-dropping arrangements of the modern types of German aeroplane. The armament comprises one or more machine-guns, generally mounted on turrets for securing motion in every direction, some firing through the propeller and synchronised by the aeroplane engine. Standard types of bombs are 22 lb., ½ cwt., 1 cwt., 2 cwt., and 6 cwt., charged with high explosive (T.N.T. and hexanitrodiphenylamine). The ratio of charge is very high. A special type of fuse is fitted in order to secure instantaneous or to delay action. Special frames (vertical or horizontal) are fitted for dropping the bombs, which are discharged in a direction tangential to their trajectory. An adapted Goerz sighting telescope in conjunction with a range-table and a direction or route corrector is employed for securing accuracy. Most bombs are fitted with stabilising vanes at their base in order to ensure the bombs falling nose-on, and to give them a certain amount of spin.

At the annual meeting of the Illuminating Engineering Society on May 14 the report of the council for the past session was presented. The society has been in communication with the authorities on various subjects, including economy in lighting with a view to fuel-saving, lighting arrangements for air-raid shelters, and the preparation of fuller statistics on the relation between illumination and street accidents. Two committees are carrying on researches for the authorities on parachute flares and luminous gun-sights. It is proposed to form a joint committee with the Ophthalmological Society, to which matters of mutual interest, comprising the effect of illumination on eyesight, can be referred. Following the conclusion of formal business, a discussion on the Lighting, Heating, and Power Order (1918) took place. Mr. L. Gaster, in opening the discussion, said that the society is anxious to assist the authorities to achieve the objects of the Order by preventing waste of light, but it is not desirable to diminish illumination to a value prejudicial to health or eyesight, liable to cause accidents, and interfering with efficiency of work. The maximum saving in fuel possible by the complete carrying out of the Order as regards lighting is small—probably within ½ per cent. of the normal total home coal consumption—but the psychological effect of extravagance in lighting must be considered. A series of recommendations on economy in lighting, prepared by the society with the concurrence of the Board of Trade, was presented. These explain the best methods of economising, importance being attached to avoidance of worn-out and inefficient lamps and burners and their use only when actually required, and to frequent cleansing of lamps and accessories liable to collect dust. In an appendix the essentials of good industrial lighting are stated, and some figures given for the illumination and consumption of gas or electricity considered desirable for various classes of work.

AN interesting address was delivered recently by Sir Robert Hadfield as president of the Society of British Gas Industries, ranging over a number of matters of current interest, such as the economy of fuel, particularly coal and coal-gas, the recent development of the metallurgical industry, scientific and technical education, trade and patent legislation. Sir Robert Hadfield lays much stress upon the very important present-day problem: how to bring about closer co-operation and greater working facilities amongst the numerous technical societies of the country. He points out that some even of our largest and most important societies have no homes of their own, but are, for the most part, housed in offices quite inadequate to the requirements of such important organisations. He quotes as an example the Iron and Steel Institute, representing an industry the annual value of the output of which is not less than two hundred millions sterling, which has offices in Victoria Street, Westminster, with its library placed in one or two small and inconvenient rooms, and contrasts this with the splendid library and spacious accommodation of the corresponding German institution. He urges wisely the need in this country for a central building in which all these technical societies would find a permanent home, with a common library, on similar lines to the Engineering Societies Building of New York, which he characterises as "the chief centre of the great and small technical societies of the great Republic." In addition to containing a fine technical library of more than 150,000 books, as well as the various offices and committee-rooms for twenty-four different societies, this building is closely connected with that of the Engineers' Club, where representatives of all branches of industry are able to meet each other; and Sir Robert Hadfield points out the real value to the technical man of such a common meeting ground.

IN the May issue of *Man* Sir C. H. Read discusses an article by Mr. More Adey in the March issue of the *Burlington Magazine* on "The Registration of Works of Art in Occupied Countries." How the Germans have dealt with the art treasures of the areas occupied by them is well known. The suggestion is that officers and men in Palestine, Mesopotamia, and the less explored frontiers of Egypt should register and preserve objects of art. Sir C. H. Read remarks that a large proportion of both officers and men of our forces now in Africa would welcome so intelligent a diversion from the routine of field or camp life. "The only danger that I foresee is lest some disciplinarian in a high place should promptly condemn the scheme as non-military and a waste of time." He suggests, to avoid this, that an order should be obtained from the War Office commending it as a means of putting the leisure of our soldiers to an intelligent use.

DR. W. L. HILDBURGH describes some Japanese charms connected with earthquakes in the April issue of *Man*. When an earthquake occurs a person in danger should repeat, over and over again, as rapidly as possible, the word *Manzairaku*, signifying "Ten thousand years of happiness." The term is used between persons as a form of congratulation; either on account of its congratulatory significance, or by some play of words, its use during an earthquake is intelligible. The Japanese, for some obscure reason, believe that a privy is the safest place of refuge during an earthquake. This may be due to the fact that the place is a haunt of spirits, and on leaving, one should throw there a piece of iron, like a nail, as a protection. On the whole, Dr. Hildburgh is disposed to connect the belief regarding the privy as analogous to the well-known principle of dressing children in dirty clothes as a charm against the Evil Eye or similar dangers.

BULLETIN No. 172 of the Agricultural Experiment Station of the Rhode Island State College contains the results of a study of infections of fowls by Messrs. P. Hadley and D. J. Lambert and Misses Dorothy Caldwell and Marguerite Elkins. It is established that *Bacterium pullorum* is the causative agent in an epidemic in adult fowls indistinguishable in its manifestations from fowl typhoid, which is caused by *B. gallinarum*. The two organisms may be distinguished by their fermentation reactions. The *B. pullorum* is present in 32 per cent. of the eggs of affected birds.

THE contention that isolation plays an important part in the evolution of species has long been accepted as a trustworthy working hypothesis, and during recent years an impressive array of evidence has been accumulated to justify this interpretation. The latest contribution to this subject has been made by Dr. Hart Merriam in a review of the grizzly and big brown bears of North America (Bureau of Biological Survey, Washington, North American Fauna, No. 41). In a review of this group twelve years ago the author recognised eight species of grizzly and brown bears. He has now increased this to eighty-six. This number, he remarks, "will appear to many preposterous"—unless they have the material before them which he has amassed. From the fine collection of skins and skulls which Dr. Merriam has brought together he has been enabled to show that no sharp dividing line can now be drawn between the grizzly and brown bears. Another surprising result is the discovery that Admiralty Island, off South-east Alaska, appears to be inhabited by no fewer than five distinct species of big bears, each of which is, apparently, related to, and representative of, an adjacent mainland species. In the matter of sexual differences Dr. Merriam is able to show that while the males commonly much exceed the females in the matter of size, in some species there is but little difference. A number of excellent photographs of skulls in profile accompany this paper, but, as the author remarks, they need to be supplemented by views showing the *Norma verticalis*, which furnishes some of the most important characters. Dr. Merriam's work will be read with the deepest interest not only by systematists, but also by those who are interested in the wider problems concerning the evolution of species.

BULLETIN No. 70 of the Agricultural Research Institute, Pusa, is an extremely useful summary by Mr. J. N. Sen, officiating Imperial agricultural chemist, of the composition of a great variety of feeding stuffs available in India, of which samples have been analysed in the laboratory of the Imperial agricultural chemist. The composition of each sample is set out in detail, so that the range of variation can be readily deduced. In addition to the ordinary analytical data, the albuminoid ratio and food units for each sample are given. The tables are prefaced by a brief introduction dealing with the general characteristics of food ingredients, digestibility, albuminoid ratios, food units, feeding standards, and the computing of rations. The bulletin gives the most comprehensive series of data available, and as such must be regarded as a valuable contribution to Indian agricultural reference literature.

The Advisory Council of Science and Industry of the Commonwealth of Australia has issued a pamphlet (Bulletin No. 5) dealing with some problems of wheat storage. The bulletin is divided into two parts dealing respectively with damaged grain and insect pests. The former consists of the report of a committee appointed to investigate the utility of quicklime for the preservation of wheat, in accordance with a scheme outlined by Mr. A. O. Barrett. After careful investigation the committee recommends that the process shall be given a trial. Its experiments and observations indicate that ordinary wheat is improved by the treatment, the deterioration of damaged wheat is checked, and any mousy taint is removed. The growth of weevils was not inhibited, nor were their eggs and the young pupæ prevented from developing. The latter problem is dealt with more fully in the second part of the bulletin, which includes a summary of reports received from the Government entomologists of the various States as to insects damaging grain, and a progress report of the special committee on the damage to stored grain by insects. The committee recommends the appointment of a qualified investigator for systematic research on the life-history of the weevils in Australia and the best means of dealing with them, and this proposal is at present under consideration by the Wheat Board.

The Weather Bureau of the United States Department of Agriculture has in active preparation an "Atlas of American Agriculture," for which the maps dealing with rainfall are practically finished. A copy of the map showing the mean annual rainfall of the United States was issued with the *Monthly Weather Review*, July, 1917, and has since been issued in a separate pamphlet. The map indicates in a marked degree the effect of the western mountains upon the distribution of the precipitation, and, in a less clear fashion, the similar effect of the eastern highlands, while it emphasises the run of the isohyets almost due north from the shores of the Gulf of Mexico between Galveston and the Rio Grande. In the accompanying text Prof. R. DeC. Ward discusses, among other topics, the climatic provinces of the United States. He divides the eastern half of the country into two provinces, Eastern and Gulf, and draws the boundary between them for the western third of its course at right angles to the north and south trend of the isohyets, so that the western third of the Gulf Province has an annual precipitation varying from 20 to 50 in. The Eastern Province contains examples of at least three types of rainfall: the summer rains of the north-west of the province, the coastal rains of the Atlantic lowlands, and an area of continuous rainfall at all seasons near the southern end of the eastern highlands; these subdivisions are ignored.

Prof. S. W. Williston and his pupils continue to make important additions to our knowledge of American Permian Reptilia and Amphibia in the Contributions from Walker Museum (vol. ii., Nos. 1–3), published by the University of Chicago. Many of the fossils are, unfortunately, so badly preserved that there is scope for much difference of opinion as to their interpretation, but the skeleton in several genera is now becoming fairly well known. Some unusually good specimens of the strange Stegocephalian Diplocaulus have just been studied by Mr. Herman Douthitt, who shows that this animal must have been shaped and lived like a skate. Since Cope originally described its very short and broad triangular skull, there has been much speculation as to its nature, and Mr. Douthitt seems to have solved the problem. Some nearly complete skeletons of the primitive reptile Labidosaurus are discussed by Prof. Williston himself, who notes the absence of a neck and the unusual strength of the feet. There are large hook-like incisor teeth in front of the upper jaw, which might assist the feet in grubbing up worms and larvæ. Prof. Williston's studies have led him to make another effort to attain a natural classification of the reptiles. He recognises four main divisions or subclasses, all beginning in Palæozoic times, and all represented by their direct descendants to-day. The Diapsida end in the tuatera, crocodiles, and birds, the Synapsida in mammals, the Parapsida in lizards and snakes, and the Anapsida in tortoises and turtles.

Under the title "Physics of the Air," Prof. W. J. Humphries, of the United States Weather Bureau, has been contributing to the Journal of the Franklin Institute since August last a series of articles on the physics of meteorological phenomena. The March issue of the Journal, *e.g.*, contains a description of the seasonal and daily changes of barometric pressure and a discussion of their causes, and the thirteen pages form chap. xi. of the series. Together they constitute a notable addition to the literature of meteorology, and it is to be hoped that the articles will be re-issued in book form, so as to be accessible to the large number of readers interested in the fundamental facts of meteorology. For such readers there has, up to the present, been no trustworthy English text-book which discussed the subject from so scientific a viewpoint or dealt with its modern developments so completely.

The *Photographic Journal* for April contains a description of the photometer for measuring the densities of photographic negatives shown at the March meeting of the Royal Photographic Society by its inventors, Messrs. Benson, Ferguson, and Renwick. The negative is placed on an opal half an inch in diameter, the top surface of which is level with that of a small table in which the opal is inserted. Light from a 15-candle-power headlight lamp placed under the table passes through the opal and negative. Light from the same lamp falls on movable mirrors, by means of which it is thrown on to the under-surface of a second opal near the first, and the distance of the mirrors from the lamp is adjusted until the two opals have the same intensity as determined by a Lummer-Brodhun cube above the table. In describing the instrument at the meeting, Mr. Renwick pointed out that the time had arrived when eye-estimates of densities were no longer sufficiently accurate to enable progress to be made in ascertaining the conditions which determine the density of a negative. In a paper which precedes the description of the photometer in the *Journal*, he shows that the optical properties of the silver grains must be taken into account before photographic densities can be explained satisfactorily.

The "natural" or spontaneous coagulation of the latex in the production of rubber has been attributed, on one hand to enzyme action, and on the other to the agency of bacteria. Mr. M. Barrowcliff, in the Journal of the Society of Chemical Industry for February 15, adduces good evidence in support of the former theory. Coagulation of latex was found to take place in normal time after addition of toluol, which acts as a bactericide, but is non-toxic to enzymes. Similarly, the addition of thymol did not inhibit or retard coagulation. Small quantities of soluble calcium salts greatly accelerated the action, as is usual with enzymes; but hydrocyanic acid, which is fatal to nearly all enzymes, completely prevented coagulation. Even the "acid" process of coagulation is considered to be enzymic, the added acid functioning as an enzyme activator.

At the present time there is only one calcium carbide factory in Great Britain; it is situated in Manchester, and is just now being enlarged to meet war requirements. There are also two small factories in Ireland, the electric current for which is supplied by water-power; but the supply of water is small and erratic, and the output of calcium carbide is only about 1 per cent. of our normal consumption. Mr. C. Bingham (Journal of the Society of Chemical Industry, March 15) gives reasons for the conclusion that in peace times we shall be quite unable to compete with water-power countries like Norway in the production of calcium carbide, unless very much more economical methods than the present ones can be found for producing electricity. From an experimental study of the question he believes this can be done by utilising waste gases from blast-furnaces and coke-ovens as the source of power for generating the current required.

In the Journal of the Society of Chemical Industry for January 31 Dr. T. Rettie gives an account of work done on antiseptics for the Medical Research Committee at the Pathological Department, Edinburgh University. An urgent requirement of the medical service at the war front was a trustworthy antiseptic for the treatment of heavily infected wounds, with special reference to spore-bearing organisms. The object, therefore, was to find an antiseptic agent thoroughly efficient as a killer of bacteria and spores, and at the same time harmless in its effect on the wound-tissues. Of the various substances tested the hypochlorites were found to be the most efficient germicides. Pure solution of bleaching powder, however, and also sodium hypochlorite solution, are drastic remedies, and on account of their strong alkalinity and high chlorine content they are unsuitable for continued application to wounds. On the other hand, aqueous solutions of hypochlorous acid itself are also unsuited for wound treatment, by reason of the fact that free chloric and hydrochloric acids develop in them through spontaneous reaction. These defects were largely overcome by using a mixture of equal weights of boric acid and bleaching powder ("Eupad"—a name derived from the initial letters of Edinburgh University Pathological Department). An aqueous solution of this ("Eusol") is prepared, of strength 25 grm. per litre; it contains about 0·26 per cent. of hypochlorous acid, together with calcium biborate. In this way the alkalinity of the bleaching powder is reduced, the full effect of the hypochlorous acid secured, and the solution cannot become unduly acid, as the dissociation constant for boric acid has a very low value. Hence the solution can be applied freely to the body tissues, and a large quantity can even be injected into the circulatory system without harmful effect. This solution has been used successfully both for the treatment of wounds and, by intravenous injection, in certain types of gas-gangrene toxæmia.

The announcements of Messrs. *Longmans and Co.* include "Elements of the Electromagnetic Theory of Light," by Dr. L. Silberstein, and (in the series of Text-books of Physical Chemistry) a new edition of Prof. S. Young's "Stoichiometry," containing rewritten chapters dealing with the more recent determinations of the atomic weights of silver, nitrogen, chlorine, and lead. Messrs. *G. Routledge and Sons, Ltd.*, are to publish "Wealth from Waste: Elimination of Waste a World Problem," by Prof. H. J. Spooner, with a foreword by Lord Leverhulme. Messrs. Routledge also announce "Incidents in the Life of a Mining Engineer," by E. T. McCarthy. Messrs. *Constable and Co., Ltd.*, will shortly publish "The Future Citizen and his Mother," by Dr. C. Porter, with a foreword by Sir J. Crichton Browne. Messrs. *Henry Frowde and Hodder and Stoughton* have in the press "Vaccines and Sera," by Capt. A. G. Shera, and "The Hearts of Man," by R. McNair Wilson.

OUR ASTRONOMICAL COLUMN.

Minor Planets.—The following ephemerides of Pallas and Ceres are from the Rechen-Institut's List:—

Pallas: Magnitude 8·8.

Date	R.A.		N. Decl.		Log *r*	Log Δ
	h.	m.	°	′		
May 26	17	9·4	25	19	0·489	
June 3	17	2·6	25	46		0·368
11	16	55·7	25	53		0·372
19	16	49·2	25	39		0·379
27	16	43·4	25	6		0·388
July 5	16	38·6	24	17	0·500	

Ceres: Magnitude 7·6.

Date	R.A.		S. Decl.		Log *r*	Log Δ
	h.	m.	°	′		
June 11	18	23·9	25	57	0·457	
19	18	16·4	26	29		0·269
27	18	8·6	26	58		0·270
July 5	18	0·9	27	23		0·274
13	17	54·0	27	44		0·283
21	17	48·2	28	1	0·461	

Planet 31 Euphrosyne was observed on April 13 and 14; the ephemeris needs the large corrections $-12{\cdot}4\text{m.} + 3^\circ\ 12'$. The interesting planet DB, discovered by Wolf on January 3, has been named Alinda.

Currents in the Upper Air.—The behaviour of the streaks or trains left by large meteors supplies abundant evidence as to the rapid motion of the atmosphere at its outer limits. The diversity of direction, as well as the rate of velocity, of these upper winds is remarkable; in fact, hurricane speed would appear to be quite a common feature amongst them. It is true that the data are not of sufficiently accurate character to allow very exact deductions to be drawn, but there is no doubt as to the general correctness of the results. In some instances the observations have been as complete as they have been precise, and these corroborate in a very satisfactory manner the average values obtained from more uncertain or incomplete records.

The long-enduring streaks of swift fireballs, like the Perseids and Leonids, are usually about fifty-five or sixty miles in height, but they may extend from heights of fifty to seventy miles. The mean velocity of their drift is 121 miles per hour, and the predominating direction to the eastward, but there is no quarter to which these lofty cosmic clouds may not be carried. Of seventy-eight enduring meteoric streaks motion was found to be directed to points at or between north-east and south-east in thirty-seven cases, while to the points north-west to south-west there were only twenty-four. The individual velocities varied from nil to 360 miles per second. In some cases a moderate speed of twenty-seven or thirty miles per hour was indicated. Certain streaks gave evidence of a series of differing currents underlying each other, the upper sections drifting in different directions to the lower.